

PREDATION ON AN INLAND HERONRY IN EASTERN TEXAS

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A nesting study was conducted in an inland heronry in Nacogdoches County, Texas during spring and summer, 1969. The findings of this study are unique in that both the initial and re-nesting attempts failed and no young survived.

METHODS

A 25-foot observation tower was constructed on the western shore of the heronry pond during February 1969, from which arrival of birds, courtship, and nest construction were observed. After the initiation of egg-laying, numbered tags were attached beside each nest containing eggs. The heronry was visited once a week before the initiation of egg-laying, twice a week during the first nesting attempt, and once a week during the second nesting attempt.

The heronry is in a natural pond bound by pine-hardwood hills on the south and west and a pasture on the north and east. A small creek passes within 50 yards of the eastern edge and several underground springs assure a water supply throughout the year. The pond is approximately 3 acres in size with one island of about one-tenth acre near the eastern shore. Buttonbush (*Cephalanthus occidentalis*) occurs extensively, comprising 80 per cent of all shrubs and trees in the pond. Rushes (*Juncus* sp.) are common throughout the pond and spatterdock (*Nuphar* sp.) covers the surface during summer. Other woody plants present in the pond in order of abundance are: red maple (*Acer rubrum*), willow (*Salix* sp.), river birch (*Betula nigra*), ash (*Fraxinus* sp.), alder (*Alnus* sp.), and sweetgum (*Liquidambar styraciflua*). The Angelina River, a large lake, and numerous small ponds and creeks, all within 3 miles of the heronry provide feeding areas for the nesting birds.

RESULTS

The birds nesting in the heronry and their estimated numbers of pairs were: Little Blue Heron (*Florida caerulea*) 181, Anhinga (*Anhinga anhinga*) 10, Green Heron (*Butorides virescens*) 6, and Common Egret (*Casmerodius albus*) 3.

A total of 127 Little Blue Heron nests were located during the first nesting attempt. Of these 67.7 per cent were in buttonbushes, 28.4 per cent in red maple, 2.3 per cent in river birch, 0.8 per cent in willow, and 0.8 per cent in sweetgum. The average height of nests above water was 3.6 feet. During the second nesting attempt 168 Little Blue Heron nests were located, most of which were newly constructed. Of these 50.7 per cent were in buttonbushes, 33.8 per cent in red maple, 10.1 per cent in willow, 2.7 per cent in ash, 2.0 per cent in alder, and 0.7 per cent in rushes. The average height of nests was 4.3 feet. The increase in average height of 0.7 feet was due to the dropping of the water level.

Ten Anhinga nests were present during the first nesting attempt: seven in willows, two in red maple and one in buttonbush. The average height of Anhinga nests during the first nesting attempt was 5.5 feet but increased to 7.4 feet during the second nesting. This increase was not due entirely to the water level dropping. Seven Anhinga nests were present during the second nesting attempt: four in red maple, two in willow, and one in ash.

Only three nests were constructed by Common Egrets, one in a buttonbush and two in red maple. The average height of nests was 3.3 feet above the water. These birds were very nervous and were the first to leave when observers approached the heronry. This possibly explains why they were not present during the second nesting period.

Six Green Heron nests were found during the second nesting period, but none during the first period. Three were in buttonbushes, two in willow, and one in red maple. The average height of nests was 2.8 feet.

Of the 127 Little Blue Heron nests located during the first nesting attempt 119 contained eggs. These had an average of 2.91 eggs each. During the second nesting 148 of the 168 nests contained eggs. They had an average of 3.01 eggs. Three of the ten Anhinga nests located during the first nesting attempt contained eggs. They had an average of 2.67 eggs. The seven nests located during the second nesting attempt had an average of 2.86 eggs. The Common Egret nested only during the first attempt and produced three nests, with an average of 2.67 eggs. The Green Heron was found nesting only during the second nesting period. Six nests with an average of 3.33 eggs each were found.

During the first nesting attempt all eggs were lost; mostly to predators. The second nesting attempt also failed due primarily to predators. Twelve Little Blue Herons and 12 Green Herons were hatched but none survived. The first nests were examined on 17 April, when 75 nests with eggs were tagged (Table 1). No evidence of predation was noted on 17 April but on 19 April predation was obvious. Forty more nests with eggs were tagged on 19 April, but in 22 of the first 75 nests tagged the eggs had been destroyed. A 4.5 foot Texas rat snake (*Elaphe obsoleta*) was collected from a Little Blue Heron nest in a clump of buttonbushes containing seven nests, four of which contained no eggs. An autopsy revealed seven Little Blue Heron eggs in the snake. At this stage of nesting most nests contained two or three eggs, indicating that at least three nests were preyed upon. Other signs of predation were several nests with egg shells and yolk and many nests without the eggs which were present 2 days previous. One nest was completely destroyed. Most of the egg predation was due to the Common Crow (*Corvus brachyrhynchos*) which were observed in the vicinity of the heronry on each visit and were observed robbing nests on several occa-

TABLE 1
EFFECTS OF PREDATION AT A HERONRY IN EASTERN TEXAS

	1st Nesting Attempt						2nd Nesting Attempt			
	April				May		June			
	17	19	22	26	1	4	13	21	28	5
Number of nests with eggs	75	115	120	125	125	125	136	147	161	161*
Number of clutches destroyed	0	22	105	111	124	125	0	47	121	160

* One nest contained two Green Heron nestlings, but were assumed destroyed since they were not present on 12 July.

sions. Raccoon (*Procyon lotor*) predation was suspected but no substantial evidence was found.

On 22 April five new nests contained eggs but 105 of the 115 previously tagged nests had no eggs. On 26 April 5 new nests with eggs were found but 111 of 120 previously tagged nests had no eggs. Most nests were destroyed by crows but 10 nests were smeared with mud indicating a predator such as a raccoon had climbed the trees. Thirteen of the remaining nests were destroyed by 1 May. A crow was observed in a clump of buttonbushes containing six of the remaining nests and mud was also found in three of the nests. On 4 May the remaining nest was found to contain no eggs; thus all 125 nests were destroyed in 17 days. The heronry was visited twice the following two weeks and no renesting attempts were observed. Only a few birds were seen feeding around the heronry. On 29 May, 66 Little Blue Herons, six Anhingas, and six Green Herons were present. One Anhinga was sitting on a nest, Little Blue Herons were standing around the pond, and Green Herons were engaged in courtship activity.

On 13 June, 136 nests with eggs were tagged but there were no signs of predation. Eleven new nests were tagged on 21 June, but 47 of the 136 previously tagged nests contained no eggs. Twenty-seven nests were completely or partially destroyed, possibly due to robbing of nest material by other birds. Several nests had egg shells and yolk material while one contained a dead, adult Little Blue Heron. The bird's neck was stripped of feathers, while the remaining parts were intact. This suggests a mink (*Mustela vison*) since they often attack the head and neck regions. On 28 June, 14 new nests were tagged but 121 of the 147 previously tagged nests had no eggs. However, young birds were found for the first time: 12 Little Blue Herons and 12 Green Herons. Fifty-six nests were partially or completely destroyed; 20 contained egg shells or yolk material and two

contained dead birds. One bird had the same characteristics of mink predation as previously mentioned, but the second was almost completely devoured.

On 5 July, 160 of the 161 tagged nests had no intact eggs or young and no new nests were found. All nestlings were missing except two Green Herons in one nest. One week later these two birds were missing, probably due to predation. The heronry was visited once a week until September and there were no indications of further nesting activity among the few birds observed.

DISCUSSION

Findings of this study, except for predation aspects, are similar to those for heronries in other southeastern states. Arrival, courtship, nest location, and nest construction for all species were similar to that reported by Meanley (1954, 1955) and Allen (1961).

Several aspects of predation are noteworthy. The complete failure of the first nesting attempt did not seem to change any aspects of nesting during the renesting attempt. A few more birds nested in red maple and fewer in buttonbush during the renesting attempt but the majority still utilized buttonbush. Nest height increased slightly during the renesting attempt but this was due mainly to the water level dropping. Due to predation, clutch size for all species was approximately one egg less than the average reported in the literature. Meanley (1955) wrote that the average clutch size of Little Blue Herons was 4.04 eggs as compared to 2.97 in our study. For Anhingas, Meanley (1954) reported an average of 3.82 compared to our 2.80. Palmer (1962) wrote that the Common Egret lays between three and four eggs as compared to our average of 2.67. Palmer also noted that Green Herons lay three or four eggs, whereas six nests in our study had an average of 3.33.

The extent of nest destruction by each predator cannot be determined but crows were thought to be responsible for the majority. Predation is present in most bird populations and usually most prevalent in the immature stages. Baker (1940) found that crows completely destroyed the eggs of a large colony of Little Blue Herons and Snowy Egrets (*Leucophoyx thula*) in Waller County, Texas. Teal (1965) in a study in Georgia found a large number of Common Egret nests destroyed by raccoons. Dusi and Dusi (1968) found in an Alabama heronry that all 214 Cattle Egret (*Bubulcus ibis*) nests were unsuccessful, and only 14.5 percent of 117 Little Blue Heron nests were successful. Predation, however, is not always present in heronries as noted by Peterson (1965), who wrote that Little Blue Herons in Missouri were not troubled by humans or predation. Also, natural

mortality, such as loss of nestlings that fell from nests or fledglings that wandered from the nest and starved, was not excessive.

A factual account of the history of the heronry we studied is not available, but according to the owner it has been used every year for at least 10 years. Detailed observations were first made in August 1968 when several nestling, fledgling, and immature birds were present. Predation has certainly not occurred in the past to the extent it did during this study or the birds would not have continued nesting there. However, it does not seem likely that predation would have been completely absent until 1969. Thus, why the sudden increase? Human activity had occurred in the past in the form of boys shooting at the birds, but no one regularly spent extended periods in the pond. Human activity may increase predation among nesting birds (Hammond and Forward, 1956) but we do not feel that our presence was the cause of this total destruction. However, we have no other suitable explanation at this time.

SUMMARY

An inland heronry consisting mainly of Little Blue Herons was studied in detail during the summer of 1969 in Nacogdoches County, Texas. Behavior associated with nesting was observed from an observation tower and nest success was followed by tagging each nest. Nesting occurred primarily in buttonbush, which was the most abundant woody plant in the heronry pond. Time of arrival, courtship, and nest building were similar to that for heronries in other southeastern states. Predation, however, was one of the most extensive ever reported. A total of 140 nests were located during the first nesting attempt but no young were produced due primarily to predators. Renesting was initiated one month later and 181 nests were located. Predators also caused the failure of this attempt although 24 young survived for a few days. Crude estimates indicate that crows destroyed the majority of the eggs and young although raccoons, snakes, and mink perhaps destroyed a few. Nesting has occurred in the pond every year for at least 10 years but detailed observations were not made prior to this study. No explanation for the total nest destruction is available although increased human activity may have been partially responsible.

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Dr. Gustav A. Swanson, distinguished conservation educator, is a recent addition to the list of Life Members of The Wilson Ornithological Society. Formerly at Cornell University Dr. Swanson is currently Head of the Department of Fishery and Wildlife Biology at Colorado State University. Dr. Swanson holds three degrees from the University of Minnesota and has published numerous papers on ornithological and conservation subjects. He is a past Treasurer of the Wilson Society, an Elective Member of the AOU, Past President of the Wildlife Society, Fellow of the AAAS, and a member of the American Society of Mammalogists, National Audubon Society, and other wildlife and conservation organizations. He is married and has three children, and considers nature photography and bird watching to be his hobbies.